

COPRODUCTION OF POWER, FUELS AND CHEMICALS

Program Description

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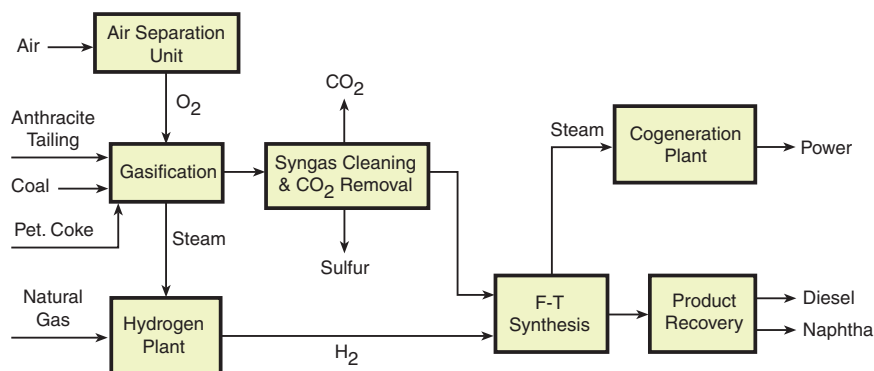
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Coproduction of power, fuels and chemicals offers an innovative, economically advantageous means of achieving the nation's energy goals. Varied amounts of these products can be made to meet market demands through the integration of three major building blocks:

- Gasification of hydrocarbon feedstocks to produce synthesis gas (syngas)
- Conversion of a portion of the syngas to high-value products such as liquid fuels and chemicals
- Combustion of syngas to produce electric power.

The goal of coproduction is to fully utilize feedstocks and maximize revenue streams. Coproduction concepts involve a number of commercially demonstrated processes for converting syngas to fuels and chemicals, including Fischer-Tropsch (F-T) technology to produce gasoline and diesel fuel, and the Liquid Phase Methanol (LPMEOH™) process for manufacture of methanol, an industrial chemical in widespread use. Power production is achieved by the use of integrated gasification combined-cycle (IGCC), an advanced technology that combines coal gasification with gas turbine and steam turbine power generation. Both conversion of syngas to methanol and IGCC have been demonstrated successfully under the Clean Coal Technology Program.

The U.S. Department of Energy (DOE) has adopted an Early Entrance Coproduction Plant (EECP) strategy consisting of feasibility studies for commercialization of coproduction. Two EECP projects are underway, as follows: (1) Waste Management and Processors, Inc. Pty LLC (WMPI) and (2) Texaco Energy Systems Inc. The WMPI project involves converting high-ash coal waste into premium transportation fuels and electricity. Coal waste not only provides a low-cost feedstock, but its use also benefits the environment by reclaiming land and eliminating a potential pollution problem. The participant is WMPI of Gilberton, Pennsylvania. The WMPI team includes Nexant (a Bechtel Technology and Consulting company), Texaco Global Gas and Power, and SASOL Technology Ltd.



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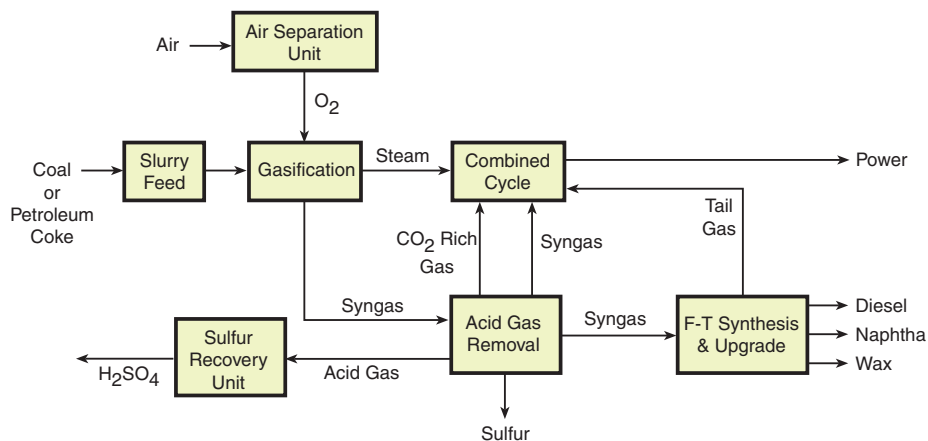
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The Texaco Energy Systems EECF project combines Texaco's coal gasification expertise with Rentech's F-T technology to produce high-quality transportation fuels, chemicals, and electric power from coal and/or petroleum coke. Joining Texaco are Brown & Root Services; GE Power Systems; Praxair, Inc.; and Rentech, Inc. The proposed plant is designed to handle a wide variety of feedstocks and is capable of making multiple products depending on market conditions.



Program Goals

The proposed EECF plants would be small-scale facilities that are intended to demonstrate successful operation of integrated technologies. Each project involves preliminary process designs, conceptual economics, and site-specific studies. If the concepts evaluated in these projects appear feasible from a technical and economic standpoint, the participants will be positioned to prepare detailed engineering designs for construction of commercial-scale plants.

Program Benefits

Coproduction can accommodate a wide range of low-cost, carbon-based feedstocks, including coal and opportunity fuels such as petroleum coke, coal waste, biomass, and municipal wastes. By taking advantage of both fuel flexibility and product flexibility, coproduction offers significantly improved economics when compared with conventional power generation. In addition, high-value, marketable products are created from low-cost feedstocks, thereby decreasing disposal costs and minimizing environmental concerns.

Gasification is one of the most efficient and cleanest of available technologies for coal-based power generation, with emissions comparable to those of natural gas-based power production. The higher overall efficiency also results in a substantial reduction in emissions of greenhouse gases, especially carbon dioxide.

The EECF strategy affords an important opportunity to address process integration and assess the financial and technical benefits of coproduction. Government support of the coproduction program will accelerate the commercial acceptance of the concept by identifying and addressing issues of integration and assessing its economic benefits.